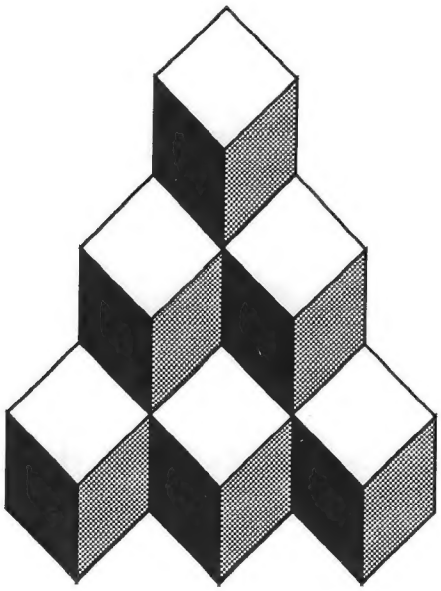
Ventura Educational Systems

Tools for Active Teaching and Active Learning



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Ventura Educational Systems

Tools for Active Reading and Active Learning

The Insect World

A Science Discovery Unit

Exploring:

- Types of Insects
- Insect Anatomy
- Metamorphosis
- The Effect of Insects on Their Environment

Integrated Science Educational Software with Tutorials, Simulations, Quizzes and Glossary

Interactive Science Series

Biology

Grades 7 and Up

Fred Ventura Ph.D.

Marne Ventura, M.A.

Ventura Educational Systems

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Program Objectives

The Insect World Learning System has been designed to provide 7th grade enrichment through adult level biology classes with interactive computer assisted instruction. Several approaches to instructional software design are blended in this educational program which is provided on three diskettes.

The main instructional purposes of The Insects World Learning System are given in these educational objectives:

1. To provide an interactive self-paced tutorial with animation to assist in the study of insects and illustrate concepts through the use of text and graphics.

2. To provide a learning tool for studying the life cycles and anatomy of insects.

3. To provide vocabulary building learning games which help students master the terminology used in the study of science and insects.

The Insect World Learning System can be used in combination with other instructional approaches. The program provides students with an interesting learning center where they can extend their general science knowledge and in particular their understanding of the insect world. When used in the science laboratory The Insect World Learning System can be used as a tool for stimulating inquiry by making detailed information available about a variety of insects, insect anatomy and life cycles. The Insect World Learning System assists the science teacher by providing reinforcements to classroom instruction and supplementary materials which may be duplicated.

Credits

Software Design — **Ventura Educational Systems**

Instructional Technology and Programming — **Fred Ventura, Ph.D.**

Editor — **Marne Ventura, M.A.**

Dr. Fred Ventura is an experienced classroom teacher and has taught elementary, secondary and college levels. He holds a doctorate in education from the University of California, and presents workshops for educators on the instructional uses of microcomputers.

Marne Ventura is also an experienced classroom teacher and holds a masters degree in reading and language development from the University of California. As a seminar leader, Marne Ventura has assisted many teachers in learning about the educational opportunities that can be derived from the use of microcomputers in the classroom.

Ventura Educational Systems publications include:

Math Grades 7 - 12
Algebra Concepts
Coordinate Geometry
Geometry Concepts
SuperGraph

Science Grades 7 - 12
Anatomy of a Fish
Anatomy of a Shark
Chemaid
The Earthworm
The Fetal Pig
The Insect World
Life Cycle of a Sea Lamprey
Marine Invertebrates
Plant and Animal Cells
The Plant
Protozoa
Senses
VisiFrog

Teacher Utilities
Clip-Art for Math Teachers
Clip-Art for Science Teachers
HyperCard Projects for Teachers

Math Grades K - 8
Base Ten Blocks
Hands-On Math Series

Math Grades 4 - 8
Beginning Geometry
GeoArt

Science Grades 4 - 8
All About Matter
All About the Solar System
All About Light & Sound
All About Simple Machines

Computer Literacy Grades 7-12
Computer Concepts
Dr. Know

Other Subject Areas Grades 4-8
Music Concepts
States

Educational Kits Grades 7-12
Hands-On Electronics

Additional Program Disks

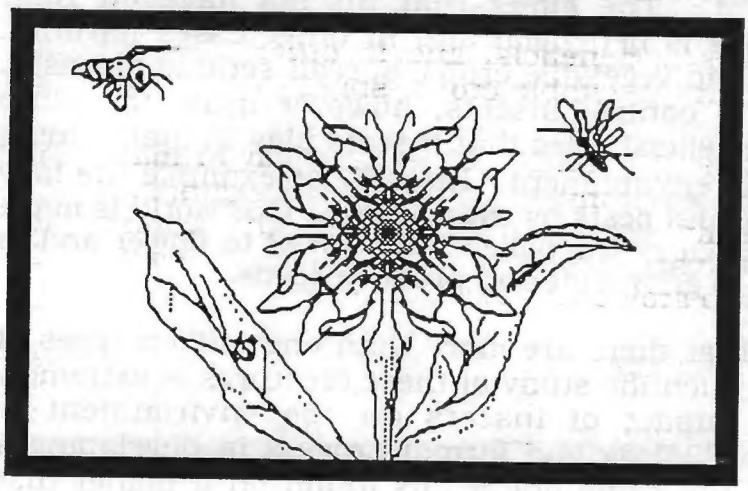
Many schools have more than one computer and to effectively use educational software require additional legal copies of a program. Additional program disks are available for use in a computer lab. The price is $10.00 per disk. Schools with a registered copy of any Ventura Educational Systems product may order additional copies of a program disk at any time. There is a 30 day warranty on original program disks. If for any reason a program disk becomes defective within 30 days of the date of purchase, Ventura Educational Systems will replace it at no charge.

An Overview of the Insect World Learning System

The Insect World is a learning system which provides a variety of integrated instructional approaches to aid the student in mastering major concepts in the study of insects.

The instructional approaches used in The Insect World Learning System are organized according to the chart shown on the next page. The structure of the program allows students to study a variety of topics pertaining to insects. At the end of each section the student is returned to a menu and is given options for further study. Each student who uses The World of Insects is able to determine the pace and direction of his learning.

Text and graphics are interactively related throughout the program to create visual aids and further a student's understanding of the concepts presented in The Insect World.



The documentation manual included with The Insect World is designed to guide the user in the use of the program. The activity pages can be used by classroom teachers as supplementary material which supports the educational objectives of the program.

The Conceptual Framework for The Insect World

The world of insects is a fascinating topic of study. Of all the animals on earth insects are the most unusual. The larvae or nymphs, the baby insects, do not at all resemble the adult forms. They live in different places, move in different ways and even eat different food than their parents. But all insects when they mature have common characteristics such as six legs, two feelers or antennae and three body parts, a head, thorax and abdomen.

Insects are the most successful type of animal if success can be measured by the number of individuals and the diverse variety of forms. The fossil records preserved in the rocks of the earth's crust indicate that insects have inhabited the earth for millions of years. Like all living things insects have evolved. Today over three-quarters of all the animals on earth are insects.

The study of insects is important because insects have an influential effect on the environment. The effect that insects have on their environment in some cases is beneficial and in other cases harmful. Insect pests destroy fruit and vegetable crops, spread serious diseases. The efforts of mankind to control insects, however must take into consideration the many beneficial roles that insects play in maintaining our beautiful and healthful environment. Insects, for example the lady bug, help control other harmful pests by eating them. Our world is made more colorful because bees carry the pollen from flower to flower and in the process help the plant to grow fruit and produce seeds.

Scientist have estimated that there are more than one million types of insects in the world. The scientific study of these creatures is extremely important because the impact of insects on the environment is substantial. The study of biology is a formal process in developing a general understanding of the living organisms found on a planet that abounds in life.

In the course of studying biology, the student develops higher order thinking skills. By acquiring a solid base in scientific knowledge and skill in analysis, synthesis and evaluation, students are better prepared for the challenges of life in a technological society. Teachers can help students to develop a genuine ability to solve scientific problems.

Content, Process and Attitude

The Insect World Learning System focuses the student's attention on the diversity found in the Insecta Class, the anatomical structure of insects and how insects survive. The classroom science teacher who uses this learning system will find that it is an interactive educational environment that provides students with the opportunity to explore many biological topics. As an information resource, The Insect World Learning System enables the student to access information which is presented in a variety of formats.

The tutorial components of the program present information sequentially and in small units. By using other sections of the program, such as the X-ray Machine, students can access the data on one topic then quickly access the data on another. The activities provided on the third disk, randomly generate problems and make each student's experience with the program unique.

Students who use The Insect World will develop a positive attitude toward the study of insects and toward science in general because the program involves the learner in the learning process. The menu driven format of this computer assisted instructional package allows the student to explore insects in his or her own way. The World of Insects introduces the student to the use of the computer as a tool for self-paced learning, simulation and research.

Interrelationships

In the study of modern science, the relationship between form and function emerges as an important theme. The Insect World Learning System utilizes computer technology to present textual and graphic information about insects, insect anatomy, insect life cycles and the relationships that insects have with their environment. Students who use The Insect World will gain from their experience essential knowledge about the various types of insects, basic anatomical structures common to most insects and how the life cycles of insects influence their environment.

Scientific Concepts

Through the use of The Insect World students become more interested in the study of biology. The capacity to grow and change is one of the basic attributes of life. Insects, during their life cycle, exhibit dramatic changes in both physical and behavioral characteristics. For example, the influence that insects have on their environment can be beneficial in one developmental stage and harmful in another stage.

The Insects Learning System presents information in a variety of formats. The lessons and activities are designed to lead students to a deeper

understanding of biological concepts and to stimulate interest in further study. The instructional design of the program provides students with an opportunity to self-direct the learning experience by using the menus to move from one lesson or activity to the next.

To develop a solid understanding of scientific concepts and true science literacy, an individual must be able to make observations and formulate and test hypotheses. These skills are enhanced when a solid foundation of factual knowledge is available from which the scientific method can be applied. The Insect World Learning System is designed to provide students with an opportunity to explore science information in an interactive, self-directed manner, and to develop a deeper interest in science by extending the students understanding of basic science concepts.

Materials

The Insect World: A Science Discovery Unit

Below is a list of the menus which are accessed when each disk is used to start the computer system.

Disk #1:	**Main Menu** **Tutorials, Insect Anatomy**
Disk #2:	**X-Ray Machine and** **Metamorphosis Machine**
Disk #3:	**Scholastic Quizzes and** **Glossary.**

Documentation and Teacher's Guide

System Requirements

Apple // Series Computer

Video Monitor (color recommended)
Disk Drive

Programming Language:	**Applesoft Basic** **DOS 3.3**

Getting Started

The Insect World Learning System is started by placing Disk #1 in the primary drive and turning on the computer system. Control-Open Apple-Reset may be used to 'warm start' the computer. Please consult the Apple User's Guide for complete system operating instructions.

When the program is started introductory screens are displayed which give an overview of the components of the learning system. After the user is familiar with the program, the introduction may be skipped by pressing the escape key, marked [esc], while the Ventura Logo and title screen is displayed.

Menu Control Keys

Several menus are used throughout the program to allow the user to select lessons and activities. These key are used to make selections from the menu.

[Arrows	**]**	**Move indicator to a choice.**
[Return	**]**	**Select the indicated choice.**
[Esc	**]**	**Return to previous menu.**

Main Menu

One of the four main learning activities can be selected from the Main Menu. To make a selection press the arrow keys to move the indicator to the desired activity then press the return key.

To exit the learning system press the escape key ([esc]).

Tutorials on Insects

After selecting Tutorials on the Insect World from the main menu, the Tutorials on Insects Menu will be displayed. A black insect is used for the indicator on this menu. Use the arrow keys to move the indicator to the desired lesson and press the return key. Proceed through the tutorial by reading the material that is presented and by pressing the return key to move forward.

Types of Insects

In the tutorial section of this program detailed information is given pertaining to a variety of insects and how the life cycles of certain insects have either beneficial or harmful influences on their environment. The Insect Collection and Insecta activities follow the Types of Insects tutorial. For suggested follow-up activities refer to Activity #1.

Insect Collection

The insect collection is an exploratory activity where the student can investigate influences of a representative sample of beneficial and harmful insects. Use the arrow keys to move the indicator to either **Scan, Info or Quit.** Use with Activity #2.

Scan

When the word SCAN is selected by pressing return, the arrow keys function to move the white indicator that is selecting a particular insect to a different box. Once a particular insect is selected press the escape key to exit the selection mode and move the menu indicator to the INFO choice and press return.

Info

If the return key is pressed while the menu indicator is on the INFO choice a screen is presented which contains detailed information about the selected insect and how this insect affects its environment. After reading the information, press the spacebar to return to the menu screen for the Insect Collection.

Quit

Selecting the quit option from the menu screen for the Insect Collection will take the learner to the game called Insecta.

Insecta

The Insecta program can be used as a follow-up activity to study types of insects and reinforce the information that has been learned about the various insects described in the insect collection. Insecta is a program which is an adaptation of one of the early approaches to artificial intelligence. The program uses a series of questions with yes or no answers to select an item from a list of similar items. The Insecta game is a learning experience which challenges the student to teach the computer what he or she knows about insects. This program can be used by classroom science teachers as a group activity. As the program is used the information that the computer has gained about insects grows. To use the program move the menu indicator to the QUERY option and press the return key. Use with Activity #3.

Query

When Query is selected the question, 'Are you thinking of an insect?' is displayed on the screen. The flashing indicator is on the word YES. The spacebar is used to switch the flashing indicator from YES to NO.

When YES is selected as the answer to the first question, the computer will respond with another question to further define the insect about which the student is thinking. Respond either YES or NO to each question until the computer either guesses the insect or gives up.

When the computer gives up it will ask you the name of the insect of which you were thinking. Type the name of the insect and press the return key. Next, the computer will ask you to type a question which can be used to distinguish your insect from another insect in the list of insects in the computer's memory. Type a question which differentiates your insect from the computers. The computer will ask whether the answer to your question is YES or NO for your insect. Indicate YES or NO by moving the flashing indicator with the spacebar and pressing the return key. The new insect is added to the list of insects that the computer knows and is used in the next game.

If you quit playing the computer will start the next game with the same two insects.

If NO is selected when the question is asked, 'Are you thinking of an insect?, the indicator will resume flashing at the word QUERY.

List

To list the names of the insects that the computer knows move the indicator to the word, LIST, and press the return key.

Quit

To exit this program and return to the tutorial menu move the indicator to the word, QUIT, and press the return key. (Note: When quit is selected the names of the insects that were added during this game are not retained.) Each time the program is used the computer begins the game with knowledge of only two insects.

Insect Body Parts

The second tutorial that can be accessed from the Tutorials on the World of Insects Menu deals the with insect anatomical structures. When the choice, Insect Body Parts, is selected from the tutorial menu another menu will be shown from which a particular part of the insect's anatomy can be selected. The choices from the Anatomy Study Units Menu are:

The Exoskeleton
Head-Thorax-Abdomen
Digestive System
Circulatory System
Respiratory System
Nervous System
Sense Organs

Use Activities 4 through 10 in conjunction with the Anatomy Study Units.

Exoskeleton

n the tutorial on the insect's exoskeleton general information is present about Arthropods and the protective function of the exoskeleton.

Head - Thorax - Abdomen

In this section of the Insect Body Parts tutorial, the head, thorax and abdomen are discussed separately. Information is present on the parts of the head: the antennae, the simple and compound eyes and the mouth parts.

The function of the antennae is exp: .ned and main types of antennae are shown graphically. The simple an: compound eyes are differentiated and how these eyes work together for insect vision is explained. The variation in insect mouths is also presented in this part of the tutorial and how the type of mouth part determines what type of food the insect eats is explained. The main parts of the insect mouth are introduced.

In the section on the thorax the legs and wings of the insect are presented. The names of the types of wings are given.

The section on the abdomen presents some of the internal organs and their functions. Reproduction and respiration are briefly introduced.

Digestive System

The section on the digestive system begins with a graphic showing the general location of the digestive tract within the body of the insect. The process of digestion in insects is introduced and the roles of the main organs involved in the process are explained.

Circulatory System

This section of the Insect Body Parts tutorial discusses the heart and how the circulation of blood is performed in the insect's body. The characteristics of insect blood are compared to the type of blood in other animals.

Respiratory System

The tiny air tubes which carry oxygen to all the cells of the insects body function differently than the lungs found in higher animals. Some of the differences are introduced in this section of the tutorial on insect body

parts. The muscles of the abdomen assist the respiratory process and the bee is used as an example of this.

Nervous System

The regulatory function of the brain, a large ganglion located in the throat area is explained in this section. Insect have many ganglia and the functions of these nerve centers are presented.

Sense Organs

In addition to the antennae and eyes insects have other sense organs. Tiny hairs cover the body and respond to touch and sound waves. How these sense organs help an insect to survive is explained in this section.

Insect Survival

When any of the insect survival units are selected from the Tutorial Menu, the user is asked to place disk #2 of The Insect World learning system in the primary drive. At the end of each lesson Disk #1 is must be reinserted in the drive in order to access the Tutorial Menu.

Insect Survival: Food

The section on the role of food in insect survival explains the adaptations that insects have made to be able to survive in diverse environmental conditions. The eating behaviors of a variety of insects are presented in this section. Use Activity #11 with this lesson.

Insect Survival: Shelter

Insect spend a great deal of their brief life spans constructing their homes. In this section of the tutorial the variety of insect habitats are discussed and compared. Use Activity #12 with this lesson.

Insect Survival: Locomotion

Locomotion is essential for all insects to survive. Insect more that any other species have developed a great variety of methods for locomotion. In this section of the tutorial the many ways in which insects travel is presented. Use Activity #13 with this lesson.

Explorations

The X-Ray Machine and the MetaMachine can be selected from the main menu or can be accessed by starting the computer from the second disk. When accessed from the Main Menu the user is instructed to insert Disk #2. The options available from X-Ray Machine/MetaMachine Menu are selected by moving the indicator to the desired choice and pressing

return. When the flashing blue box is indicating the X-Ray Machine and the option INFO is select information about the use of the X-Ray Machine is presented. When the blue box is indicating the MetaMachine information about the MetaMachine is presented. After selecting the INFO choice the option to RUN the selected program is given.

X-Ray Machine

The X-Ray Machine turns the computer into a powerful tool for learning about the anatomical structures of the insect. Use of the program begins by first selecting the internal structure, respiratory system or nervous system as a topic of study. Select a topic by entering a 1, 2 or 3 when prompted to do so. An option is also given to turn the sound on or off in the program.

The options in the X-Ray Machine are as follows:

X-Ray/View

Pressing return when the indicator is on either X-Ray or View toggles the graphic screen from the external view of the grasshopper to an internal view or display of an anatomical system. This option can be used to study the relative locations of organs in the grasshopper.

Info

The INFO option can be selected by using the arrow keys to move the indicator to the word INFO and then pressing return. The INFO option causes the computer to display a listing of all the anatomical structures shown in the current view of the grasshopper. The INFO option can be selected for either view of the grasshopper.

Probe

When PROBE is selected a red box appears in the section of the screen above the grasshopper. In the box an anatomical structure and its function is given. A flashing indicator will show the location of the structure on the grasshopper. The arrow keys can be used to move the indicator to other anatomical structures. The escape key, ESC, is used to exit from the probe option and activate other menu options.

Like the INFO option, PROBE can be selected for either view of the grasshopper.

Quit

By pressing RETURN when the indicator is on the QUIT option the program returns to the option for selecting the internal view or anatomical system. Pressing ESC at this point cause the computer to return to the X-Ray Machine/MetaMachine Menu.

Activities #14-#17 supplement the X-Ray Machine.

MetaMachine

The MetaMachine provides the user with the opportunity to study the life cycle of a butterfly. Ten phases in the life cycle are represented graphically within boxes.

Phase

The current location of the phase indicator is show by an double violet line and an arrow leading to the next phase in the cycle. By pressing return when the indicator is on PHASE the user can advance to the information on the next phase. A phrase is shown at the bottom of the graphics which tells about the phase. More information about the selected phase can be accessed by selecting DATA.

Data

By moving the indicator to the word DATA and pressing return, the user is given the opportunity to read detailed information about a particular phase in the life cycle of a butterfly. After the information is studied any key can be pressed to return the MetaMachine.

Probe

PROBE functions like the PROBE option in the X-Ray Machine. A red box is shown on the screen and the user is given an opportunity to study the anatomical structures of the butterfly and what role each structure plays in the process of metamorphosis. The arrow keys are used to move the indicator and escape is used to re-activate the other options available within the MetaMachine.

Quit

The QUIT option returns the user to the X-Ray Machine/MetaMachine Menu.

Activities #18,19 and 20 are supplements to the MetaMachine.

Scholastic Quizzes

The Insect World learning system provides the user with the opportunity to study the vocabulary used in the program in a variety of way. The Scholastic Quizzes can be accessed from the Main Menu or by starting the computer with Disk #3. The options from the Scholastic Quiz Menu are: Vocabulary Whiz, Scrambler, WordSearch, Insect Hunt, and Glossary.

Use the arrow keys to move the indicator to the desired option. At the bottom of the screen a brief description of the activity is given. When the desired option is indicated press return to start the program. Activities #21-#24 can be used to supplement the Scholastic Quizzes.

Vocabulary Whiz

Vocabulary Whiz is a learning tool which is designed to reinforce the student's understanding of the terminology used in the program. The program begins by presenting a brief introduction to the use of the program and explanation is given of how points are earned in the game. The student is asked to set a goal in points (the minimum is 10 points).

When the game begins six categories for science words are shown in boxes at the top of the screen. A flashing green indicator box jumps randomly from one category to another. When any key is pressed the indicator stops and the program retrieves a definition from the glossary of terms used in the program.

The definition of the term is presented at the bottom of the screen and the student is prompted to enter correct spelling of the term that is defined. Blanks are used to show the number of characters in the term. The program encourages correct spelling of the term by not accepting letters which are incorrect. Each incorrect letter results in the loss of a point, however the score will never go below zero. Each correct letter earns a point. The student continues playing letters until the entire word is entered.

When the word is completely entered the program checks the score to determine if the student has reached the goal. If the goal has been reached the game terminates. If the goal has not been reached, play resumes with the indicator highlighting categories and a new word is selected from the glossary for the next round of play.

Scrambler

This program challenges the student to quickly unscramble the letters in a term when prompted with the definition of the term. The program randomly retrieve a term and definition from the glossary. The letters in the term are scrambled and presented in the upper section of the screen. The definition is presented in the lower section. A timer at the top of the screen shows the elapsed time. The object of the game is to spell as many words as possible in the shortest amount of time. At any time the program can be exited by pressing the escape key [ESC].

WordSearch

The WordSearch program challenges the student to find in a puzzle ten randomly selected terms from the glossary. After the ten words are retrieve the WordSearch game board is shown. The program will pause for a moment as the computer creates the unique puzzle for this group of words. When ready the grid will fill with letters and a menu will appear at the bottom of the screen. The words in the puzzle are arranged horizontally, vertically and diagonally and can be written either backwards and forwards.

A flashing box will be shown at the top left corner of the grid. Study the grid to find one of the vocabulary words. Use either the arrow keys or i,j,k and m to move the box to the first letter of one of the ten words. When the indicator is highlighting the first letter press the spacebar to mark the letter then move the indicator to the last letter of the word and press return. If the marked letters spells one of the words in the list the word will be shown in the large box on the right of the screen. If the letters that were marked do not spell a word in the list no word appears in the large box. Continue finding words until all words have been located in the puzzle.

The question mark key [?/] can be used to view the list of words that are remaining in the puzzle. At any point this program may be exited by pressing the escape key [ESC]. The program returns to the Scholastic Quiz Menu.

Insect Hunt

Insect Hunt is a challenging game that integrates the students deductive reasoning and mathematical skills with learning about insects. The program reinforces the use of the Cartesian Plane for locating points. The object of the game is to locate and identify from a description an insect which is hiding somewhere on a grid.

The options from the first menu of this game are: PLAY, HELP or QUIT. For the first time user it is recommended that the help option be selected and the instructions for the game read. When the option PLAY is selected, an insect will run about the screen and then vanish. At the start of the game, a flashing X appears at the origin. The MOVE option can be selected from menu by pressing return. The use may also opt to move the menu indicator to HINT to get a clue about the location of the insect. (Each hint decreases the score by one point.)

If MOVE is select the user is prompted to enter values for the x and y coordinates. After the coordinates have been entered, the flashing X moves to the location that has been selected if the insect is in this position on the grid a message will appear stating that the insect has been located. If the insect is not at this location, the message No Insect Here is displayed and the game continues.

When the location of the insect has been deduced the user is prompted to press any key to continue. At this point a description of the insect is displayed on the screen and the user is to type in the name of the insect. If the name is entered correctly 10 points are awarded. If the name is incorrect, the correct name is displayed and the first menu is restored.

Glossary

The Glossary can be accessed from the Main Menu and also from the Scholastic Quiz Menu. The Glossary allows the user to enter a term, then the computer retrieves the term from the Glossary of Terms stored on Disk #3. The Glossary program presents three options which are selected by using the arrow keys to move the indicator and pressing return when the desired option is highlighted. Activity #25 can be used with the Glossary.

Search

The Search option prompts the user to enter a term. After typing a term on the input line, press the return key. The program then searches the glossary and attempts to find the term that has been entered. If the term is found in the glossary the definition of the

term will be displayed. If the term is not in the glossary the message 'Not Found' is displayed in the center of the screen.

Quiz

Selecting the Quiz option from the Glossary Menu will take the user to the Scholastic Quiz Menu where an activity can be selected to practice the new terms that have been learned from using the Glossary. See the Scholastic Quizzes section of this manual for instructions on how to use the quiz programs.

Exit

This option is used to return to the Main Menu. (Note: it is necessary to reinsert Disk #1 in the drive to complete this operation.)

Supplementary Materials

Student Record Sheets

Student Record Sheets are provided for the teacher to record the student's progress in using The Insect World. Form A permits the teacher to record which sections of The Insect World learning system have been completed by each individual student. Form B is designed to be used for recording the scores students achieve using the Scholastic Quizzes. Since each the computer generates random problem in the Scholastic Quizzes, it is appropriate to have the students use these programs repeatedly. Provision is made on the record sheet for the student to record the date and score achieved with the Scholastic Quizzes.

Name Date

The Insect World
Student Record

Study Units Check List
Form A

Tutorials		
Types of Insects	1	
Insect Collection	2	
Insecta	3	
Insect Body Parts		
Exoskeleton	4	
Head-Thorax-Abdomen	5	
Digestive System	6	
Circulatory System	7	
Respiratory System	8	
Nervous System	9	
Sense Organs	10	
Insect Survival		
Food	11	
Shelter	12	
Locomotion	13	

Explorations		
X-Ray Machine		
External View	14	
Internal Structure	15	
Respiratory System	16	
Nervous System	17	
MetaMachine	18	
The Adult	19	
The Egg	20	
The Larva	21	
The Pupa	22	
Scholastic Quizzes		
Vocabulary Whiz	23	
Scrambler	24	
Word Search	25	
Insect Hunt	26	

Comments:

Name Date

The Insect World
Student Record

Study Units Check List
Form B

Vocabulary Whiz

Round	Score
1	
2	
3	
4	
5	

Scrambler

Round	Score	Time
1		
2		
3		
4		
5		

Wordsearch

Insect Hunt

Insects	
Hints	
Score	

Insects

Name Date

The Insect World Activity #1

Types of Insects

Complete this activity after using the tutorial program to study types of insects.

1. Name the phylum of which insects are a member.

2. Draw a line to the fraction which shows how animal groups are distributed on the earth.

Insecta	**Less than 1/12**
Chordata	**About 1/6**
Other Animals	**About 3/4**

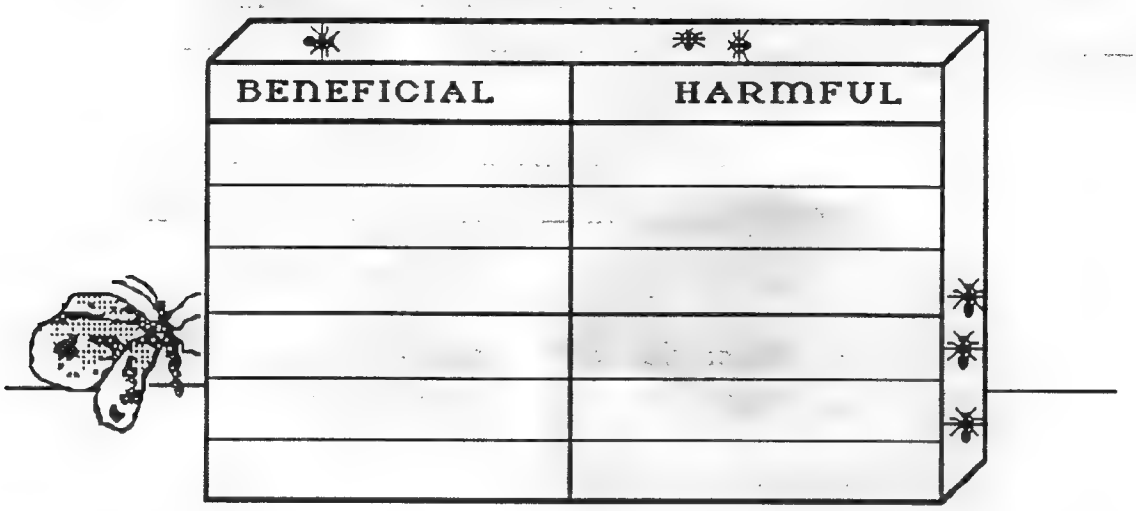
3. Why are insects described as the most successful animal?

Name Date

The Insect World Activity #1

Types of Insects

4. Write the names of beneficial and harmful insects.



BENEFICIAL	HARMFUL

5. Field Assignment: Find an insect in your environment and observe it for 5 minutes. Draw your insect and write a description in the spaces below.

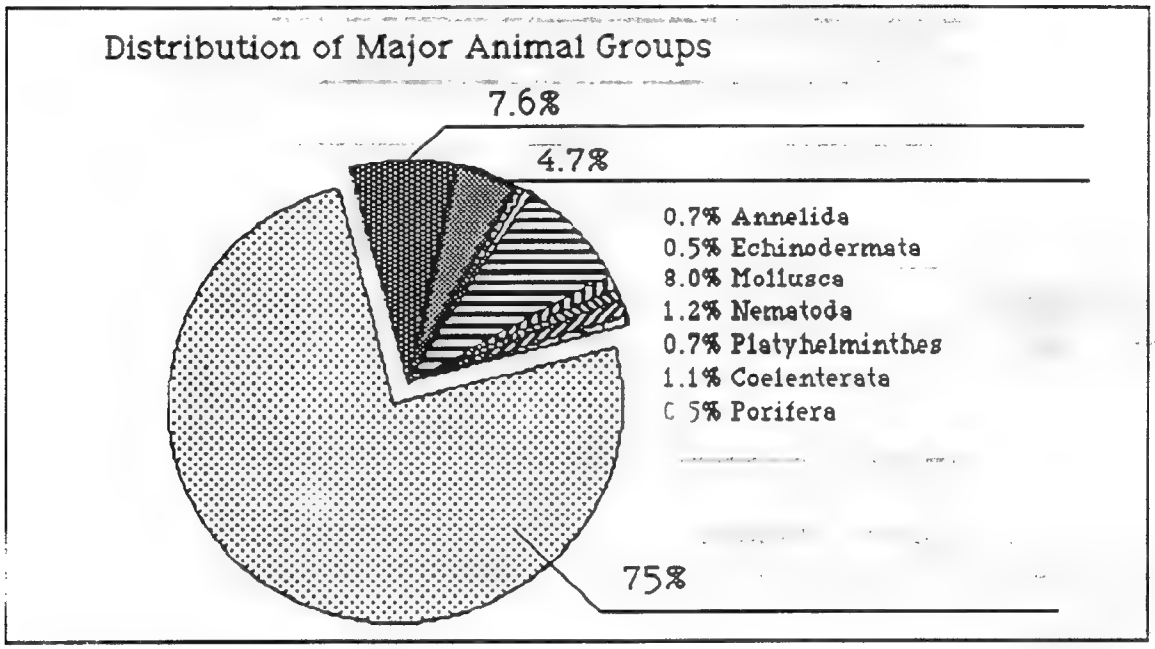
Drawing

Name Date

The Insect World Activity #1	Types of Insects

6. Label this graph.

Use the Names: Insecta, Other Arthropoda and Chordata.



7. Name some of the animals in each group.

Insecta	Other Arthropoda	Chordata

Name Date

The Insect World Activity #2

Insect Collection

1. Make a sketch of each insect in the Insect Collection Database.

Insect Collection


aphid


mosquito


housefly


termite


lady beetle


dragonfly


honeybee


ant lion


silkworm moth


blister beetle

2. Place a check in each category if the characteristic is true for the insect.

Insect	produces a product	causes disease
aphid		
mosquito		
housefly		
termite		
lady bug		
dragonfly		
honeybee		
ant lion		
silkworm moth		
blister beetle		

Name Date

The Insect World Activity #3

Insecta

1. Make a list of the insects and questions used while you play the Insecta Game.

Insect	Question	Answer	
		Yes	No

Name Date

The Insect World Activity #4

Anatomy Study Units
The Exoskeleton

Read each question before studying The Exoskeleton. Choose The Exoskeleton from the Anatomy Study Units Menu. Answer these questions after you have read the lesson.

1. What scientific fact proves that the body of an insect is well-equipped for survival?

2. What are some characteristics of the exoskeleton?

3. How does an insect produce its exoskeleton?

4. What does the word Insecta mean?

5. What is the name of the process where an insect sheds its skeleton and produces a new one?

Name Date

The Insect World Activity #5

Anatomy Study Units
Head-Thorax-Abdomen

Read each question before studying The Head Thorax and Abdomen. Choose The Head-Thorax-Abdomen from the Anatomy Study Units Menu. Answer these questions after you have read the lesson.

1. Write a sentence telling the main parts of an insect's head.

2. Antennae are used to classify insects. Name the main types of antennae.

3. How do antennae help the insect to survive?

Name Date

The Insect World Activity #6

Anatomy Study Units
Digestive System

Read each question before studying The Digestive System. Choose The Digestive System from the Anatomy Study Units Menu. Answer these questions after you have read the lesson.

1. Show the sequence of the digestive process by numbering each of the items in this list.

☐ the gizzard grinds the food

☐ waste moves to the hindgut and is excreted

☐ in the midgut digestive juices break food into nutrients

☐ food enters the insects mouth

☐ food enters the crop and is mixed with saliva

2. Draw lines to match each part of the digestive tract with a function.

mouth	digestive juices break down food
crop	grinds food
gizzard	mixes food with saliva
midgut	food intake

Name Date

The Insect World Activity #7	Anatomy Study Units Ciculatory System

Read each question before studying Circulatory System. Choose The Circulatory System from the Anatomy Study Units Menu. Answer these questions after you have read the lesson.

1. Describe the location and shape of the insect's heart.

2. Why is an insect's blood yellowish in color?

3. Why does the blood of an insect sometimes appear to be red?

4. Describe how the heart of an insect functions to supply blood.

Name Date

The Insect World Activity #8

Anatomy Study Units
Respiratory System

Read each question before studying Respiratory System. Choose The Respiratory System from the Anatomy Study Units Menu. Answer these questions after you have read the lesson.

1. In an insect, how is oxygen carried to the cells of the body?

2. Why does an insect need oxygen?

3. What is the role of the spiracles in the respiratory process?

4. How does the abdomen of the bee function to assist the respiratory process?

Name Date

The Insect World Activity #9	Anatomy Study Units Nervous System

Read each question before studying Nervous System. Choose The Nervous System from the Anatomy Study Units Menu. Answer these questions after you have read the lesson.

1. Describe the nervous system of primitive insects.

2. How is the nervous system of higher insects different from the primitive insects?

3. What are ganglia and how do they function?

4. Can an insect function with an incomplete nervous system? Explain.

Name Date

The Insect World Activity #10

Anatomy Study Units
Sense Organs

Read each question before studying Senses Organs. Choose Sense Organs from the Anatomy Study Units Menu. Answer these questions after you have read the lesson.

1. What other sense organs do insects have in addition to the eyes and antennae?.

2. Speculate on how the sense organs of an insect help it to survive.

Name Date

The Insect World Activity #11	Anatomy Study Units Food

Write a word or phrase in each blank to complete these sentences.

1. Insects have flourished for about _____ years.

2. Insects live _____, _____, _____, _____, _____, and _____.

3. Insects have developed _____ and _____ adaptations to meet all the varied conditions that have occurred on the earth.

4. The _____ of an insect determines which kind of food it eats.

5. The _____ of a butterfly is used for getting the nectar of flowers.

6. The female mosquito uses a _____ appendage for piercing the skin and sucking blood.

7. The upper jaw of a grasshopper moves _____ and enables it to grind food.

8. Most insects eat _____, _____, _____, and _____.

Name Date

The Insect World Activity #12

Anatomy Study Units
Shelter

Write a word or phrase in each blank to complete these sentences.

1. Insects spend most of their time _____

   _____.

2. Each ant colony has a queen who _____, workers who _____, soldier ants who _____, and nurse ants who _____.

3. Some wasps build _____ out of clay.

4. Some insects dig or cut _____ which vary in length from an inch to over five feet.

Draw a line to connect each insect with the type of shelter the insect builds.

leaf-cutters	small clay jug
mud daubers	paper nest
potter wasps	underground tunnels
bald-faced hornet	clay nests
ants	hole in stem

Name Date

The Insect World Activity #13	Anatomy Study Units Locomotion

Write a word or phrase in each blank to complete these sentences.

1. The middle section of an insect is called the thorax and is the center for _____.

2. In all insects the thorax bears three _____, _____ and two _____.

3. Some insects leap but other can move by _____, _____, _____, _____, _____ and _____.

4. Some types of beetles _____ underwater to catch food.

5. _____ are able to walk on water.

6. Whirligig beetles also live and walk on water but are also able to carry a _____ as an oxygen supply when underwater.

7. Dragonfly nymphs have _____ like a fish and can actually breathe underwater.

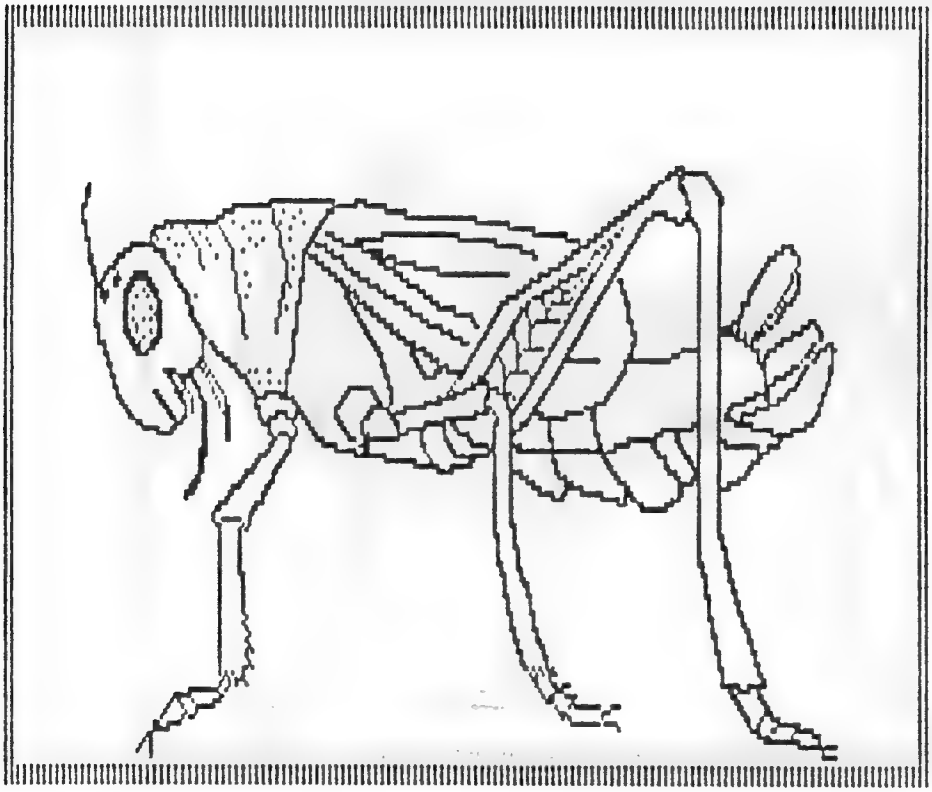
8. The adult dragonfly can fly at speeds up to _____ miles per hour.

Name Date

The Insect World Activity #14

X-Ray Machine
External View

Label the diagram below with a letter to show the location of each part of the grasshopper's external structure.



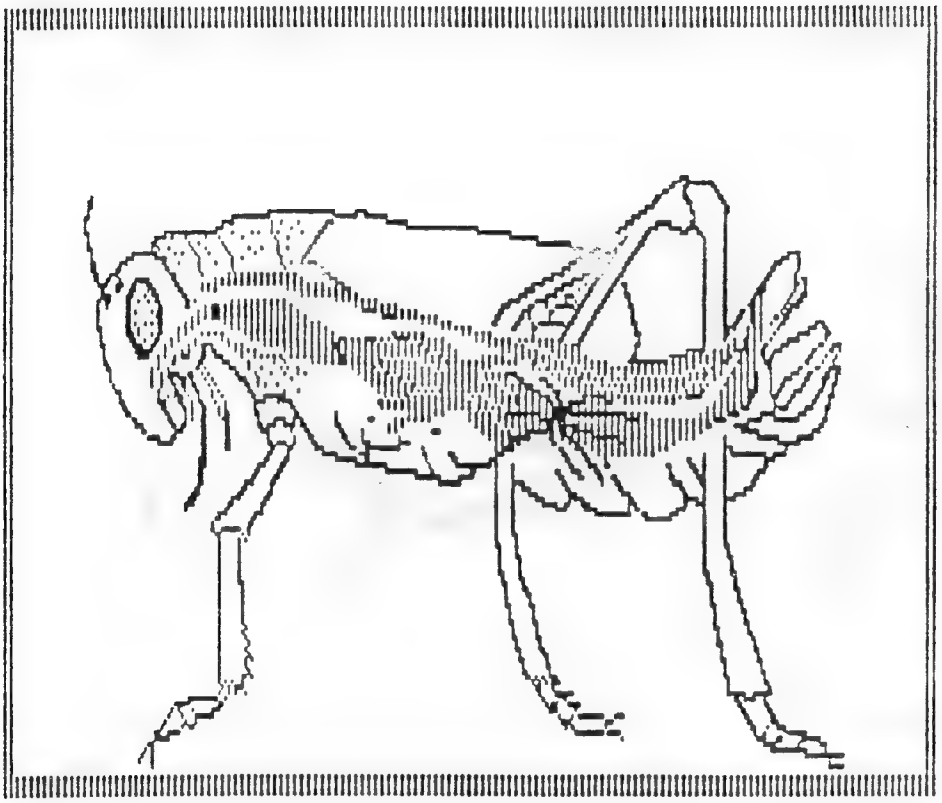
A. antenna
B. compound eye
C. simple eye
D. labrum
E. mandible
F. maxilla
G. palp
H. labium
I. prothorax
J. mesothorax
K. metathorax
L. coxa
M. trochanter
N. femur
O. tarsus
P. foreswing
Q. segments
R. spiracles
S. auditory membrane
T. ovipositor

Name Date

The Insect World Activity #15

X-Ray Machine
Internal View

Label the diagram below with a letter to show the location of each part of the grasshopper's internal structure.



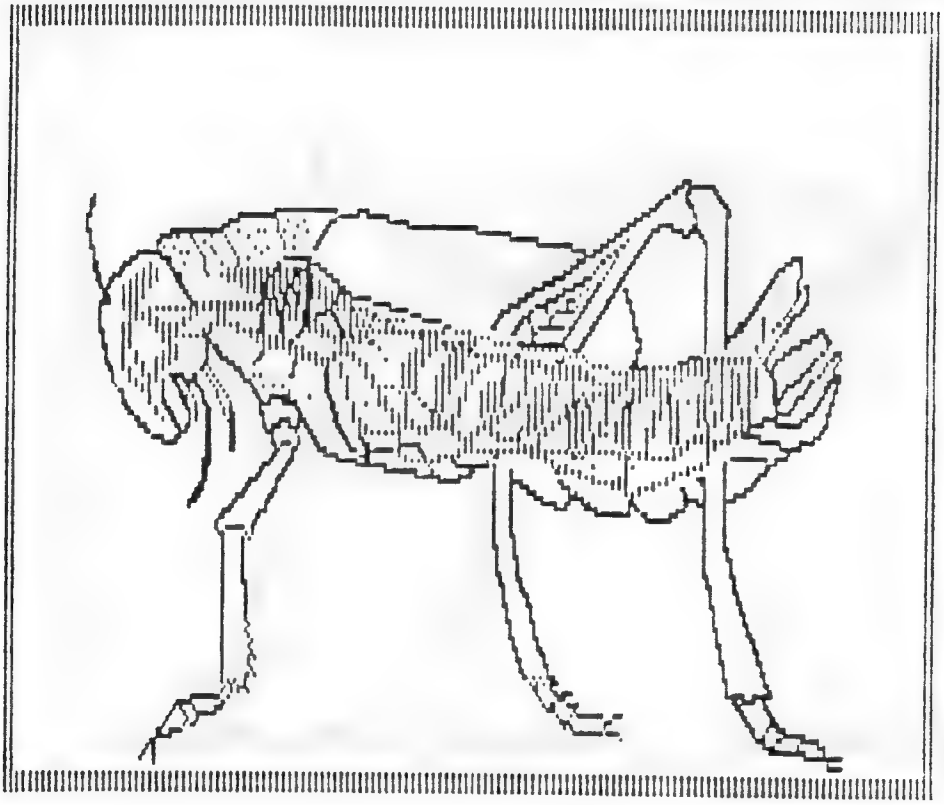
A. mouth
B. salivary duct
C. salivary gland
D. pharynx
E. esophagus
F. crop
G. gizzard
H. midgut
I. cecum
J. anterior intestine
K. posterior intestine
L. anus
M. malpighian tubules
N. pericardial cavity
O. ostia
P. heart
Q. aorta
R. hemocoel

Name Date

The Insect World Activity #16

X-Ray Machine
Resipratory System

Label the diagram below with a letter to show the location of each part of the grasshopper's respiratory system.



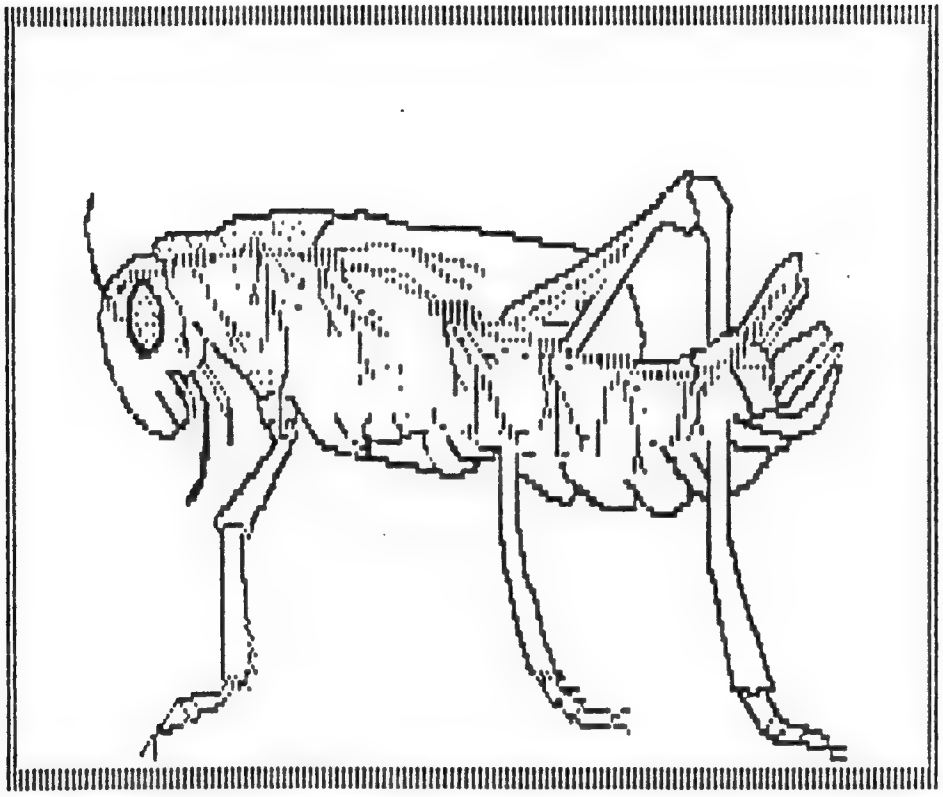
A. spiracle
B. trachea
C. tracheole
D. cephalic air sac
E. thoracic air sac
F. abdominal air sacs

Name Date

The Insect World Activity #17

X-Ray Machine
Nervous System

Label the diagram below with a letter to show the location of each part of the grasshopper's nervous system.



A. brain
B. nerves to eye
C. nerves to antennae
D. connectives
E. subesophageal
F. 1st thoracic
G. 2nd thoracic
H. 3rd thoracic
I. abdominal ganglia
J. nerves
K. nerve cord

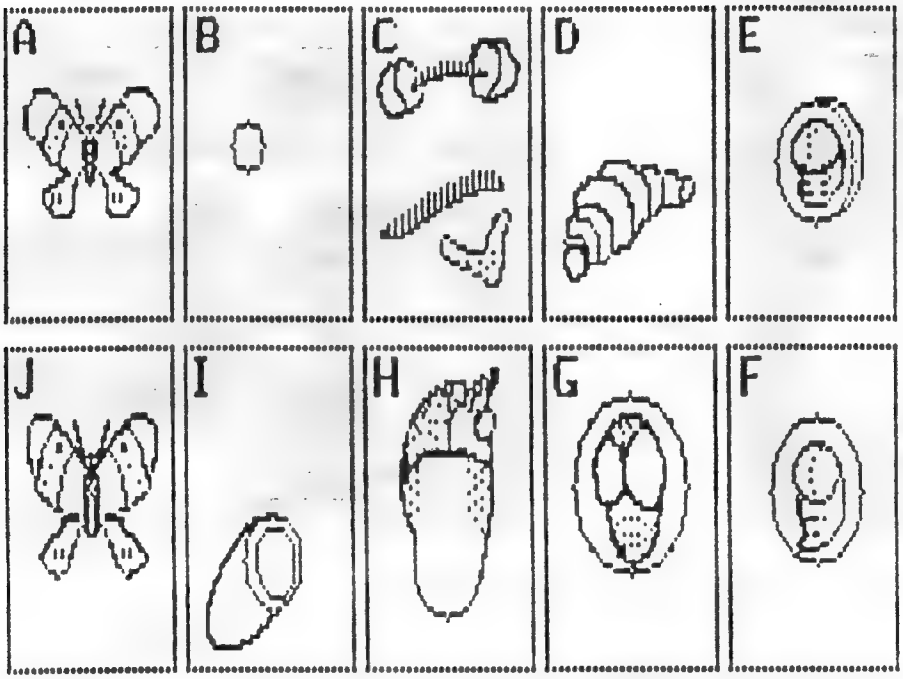
Name Date

The Insect World Activity #18

MetaMachine
Metamorphosis

Write the letter of the picture that goes with each of the phases listed below.

METAMORPHOSIS



_____ ❑ The cocoon is discarded...
_____ ❑ The life cycle begins again...
_____ ❑ Larva develops a voracious appetite...
_____ ❑ The pupa resembles the adult...
_____ ❑ A new adult butterfly emerges...
_____ ❑ The pupa matures in its cocoon...
_____ ❑ The pupa or chrysalis develops...
_____ ❑ Adult butterfly produces an egg...

Name Date

The Insect World Activity #19	MetaMachine The Adult

Use the MetaMachine to access data about the adult stage of the butterfly life cycle.

Complete these exercises.

Match Up

ovaries	carry eggs to vagina
oviducts	releases egg
vagin	produce eggs
ovipositor	fertilization

Choose the correct answer by drawing a line.

The ad phase is relatively

- ○ short.
- ○ long.

When the adult emerges all organs and appendages are

- ○ functional.
- ○ immature.

The purpose of the adult phase of the life cycle is

- ○ respiration.
- ○ locomotion.
- ○ reproduction.

Name Date

The Insect World Activity #20	MetaMachine The Egg

Use the MetaMachine to read data about the egg stage of the butterfly life cycle.

Define these terms using the MetaMachine and the glossary.

ovipositor

egg

reproduction

ovary

vagina

Name Date

The Insect World Activity #21	MetaMachine The Larva

Use the MetaMachine to read data about the larval stage of the butterfly life cycle.

Complete this sentence by filling in the blanks with the words given below.

The growth of the _____ is regulated by _____. As the larva_____ it will molt its _____. This _____ occurs repeatedly.

cuticle	larva	process	hormones	grows

After the _____ period the _____ phase begins due to a _____ in hormones. The _____ of the pupa may take an entire _____(winter)

season	decrease	larval	pupa	formation

Name Date

The Insect World Activity #22	MetaMachine The Pupa

Use the MetaMachine to match the words or phrases with a definition.

A.	emergence of adult
B.	wing formation
C.	remains of cocoon
D.	formation of pupa
E	cocoon
F.	late-stage pupa
G.	further development
H.	formative cells

_____start of metamorphosis

_____composed of silk filament

_____beginning of new organs

_____adult organs form

_____flight appendage

_____resembles adult form

_____cocoon discarded

_____now useless

Name Date

The Insect World Activity #23

Scholastic Quizzes
Vocabulary Whiz

Select Vocabulary Whiz from the Scholastic Quizzes Menu. Circle a point goal below.

25 points. ..... Bug Brain
50 points ..... Promising Scholar
75 points ..... Aspiring Entomologist
100 points ..... Entomology Expert

Write the terms in categories that were used in the game. On a separate page use each word in a sentence.

Insects	Anatomy

Ecology	General Science

Life Cycles	Insect Survival

Name Date

The Insect World Activity #24

Scholastic Quizzes
Scrambler

Choose four players for Team A and four for Team B. Select Scrambler from the Scholastic Quizzes Menu. Record the scores and compute the average score.

	Team A	Words	Time	Average
1.				
2.				
3.				
4.				

Total _____

	Team B	Words	Time	Average
1.				
2.				
3.				
4.				

Total _____

Name Date

The Insect World Activity #25

Scholastic Quizzes
WordSearch

Choose the WordSearch activity from the Scholastic Quiz Menu. Write the ten words used in the puzzle. After solving the puzzle use the Glossary to write a definition for each word.

1	6
2	7
3	8
4	9
5	10

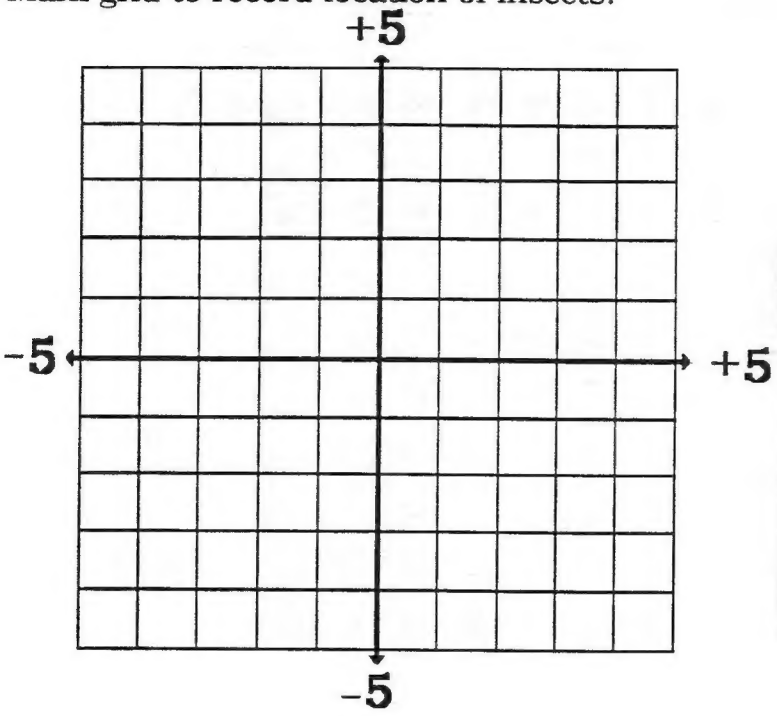
Name Date

The Insect World Activity #26

Scholastic Quizzes
Insect Hunt

Use the Insect Hunt activity to locate ten insects.

Mark grid to record location of insects.



Scoreboard	
Insects	
Hints	
Score	

Complete this table.

Insect	Coordinates		Name
	x	y	

